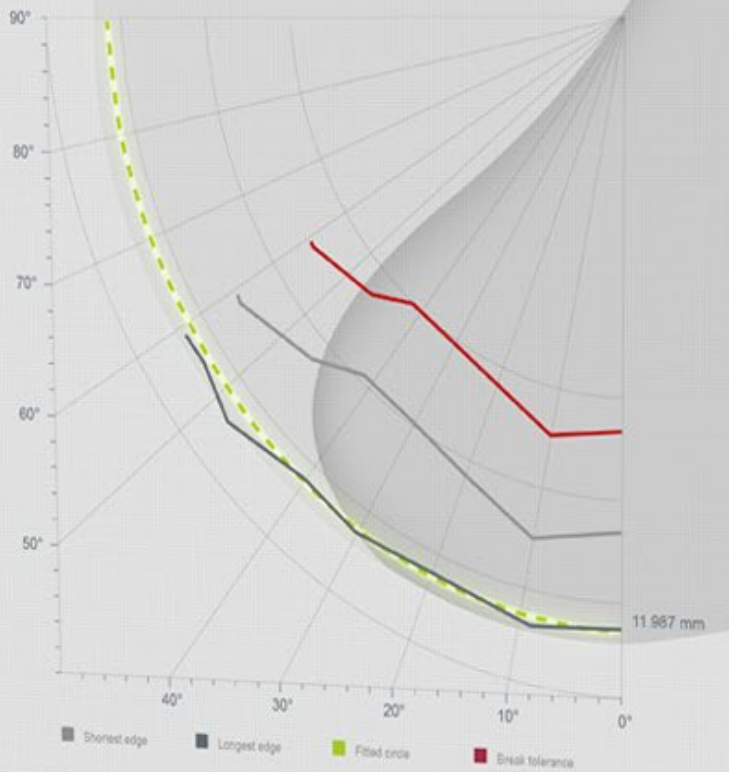


BALL MILL | TOOL ID 17



JOB DATA

Job ID	7
Name	KF R3 Contour
Tool ID (Cut)	17 (1)
Date	23.08.19
Time	11:54
RPM	6000

MEASUREMENT DATA

Fitted Radius	2.983
Fitted Length	100.057
Preview Algorithm	Best Fit
Preview Radius	2.976
Preview Length	100.054



Error Edges Previous Eval Next Eval

Back

FUNCTION KEYS

F1 F2 F3 F4 F5 F6

INPUT PANEL



BLUM
focus on productivity



LC-VISION

MEASURING AND VISUALISATION SOFTWARE

LC-VISION is an innovative measuring and visualisation software solution for DIGILOG laser measuring systems from BLUM. The application, which has been redesigned from the ground up, features an entirely new approach to functionality and user friendliness. With its intuitive operating design, a number of measuring tasks can be generated, visualised and analysed quickly and easily on the control screen. The field of application is not only limited to the topic of tool measurement, but also includes a reliable assessment of the motor spindle quality.

01 SYSTEM OVERVIEW

TECHNOLOGY

The LC-VISION software has a modular design. The basic version provides the user with many helpful functions which support the use of the laser measuring systems. For specific applications, the range of functions can be easily extended by optional technology cycles. For the currently available options, please contact your local BLUM office.



LC-VISION					
STANDARD FUNCTIONS		TECHNOLOGY CYCLES			
Views	ToolControl	ToolControl Advanced	SpindleControl	OscillationControl	...
- Diagnostic view - License Manager - Tool dashboard	- Job creation - Visualisation of the longest cutting edge - Evaluation - Stability function	- Job creation - Visualisation of all cutting edges - Evaluation - Stability function - Fitting methods - Circular segment cutter - 3D RadiusControl - ...	<div style="border: 1px solid black; padding: 5px; text-align: center;">Basic</div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 5px;">Advanced</div>		

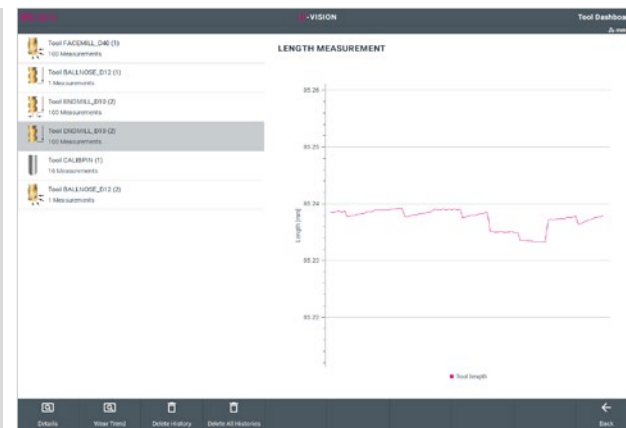
02 STANDARD FUNCTIONS

TOOL DASHBOARD, DIAGNOSTIC VIEW AND LICENSE MANAGER

From using even the basic functions of LC VISION it can offer real added value, as current measurement processes, important system information and data for preventive maintenance can be accessed quickly and easily on the control screen. Special technology cycles can also be easily enabled.

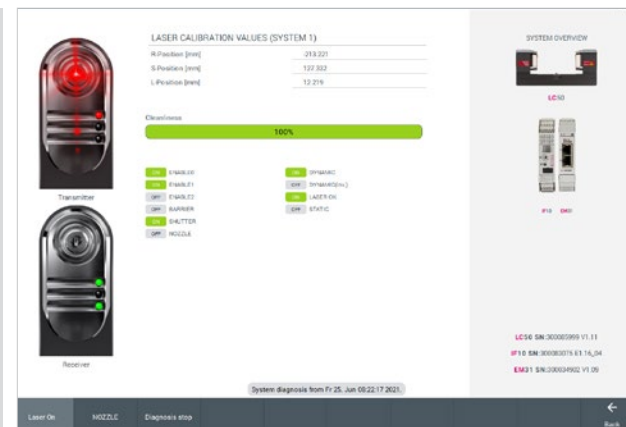
TOOL DASHBOARD

The tool dashboard provides a quick overview of all measurements that are performed with the help of BLUM NC cycles. Here, not only the measurement process, but also the wear trend of the respective tools is visualised.



DIAGNOSTIC VIEW

This view shows important system data, enables manual activation of laser functions and provides preventive maintenance information.



LICENCE MANAGER

The licence manager can be used to display the currently available technology cycles and to easily activate further options via an activation code.



03 TOOLCONTROL

STANDARD FUNCTIONS FOR A WIDE RANGE OF TOOLS AND TASKS

ToolControl is an intuitive software interface for the generation of measurement sequences and the documentation of measured values.

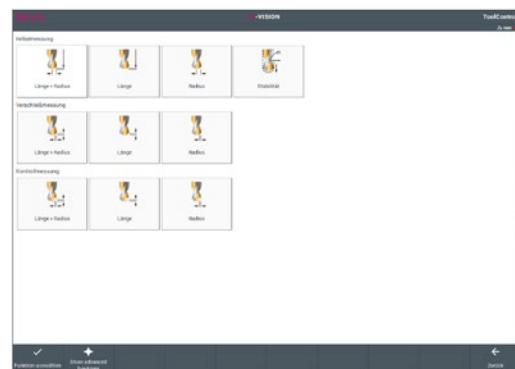
- Simple creation of tool-specific measurement sequences (jobs) for standard measuring tasks
- Measurement of the longest tool cutting edge
- Visualisation of measurement process and wear limits on the control screen
- Stability function

For information on the extensive functions of the "ToolControl Advanced" technology cycle, please refer to the "Technology cycles" chapter.

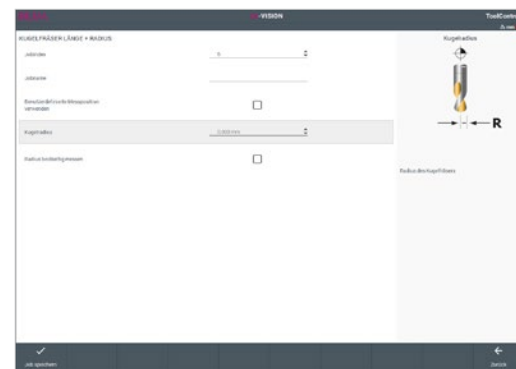
FUNCTIONALITY

1. Job creation

- Intuitive generation of jobs for standard measurement tasks
 - Initial measurement
 - Wear measurement
 - Control measurements
- A user interface for all common machine controls
- Step by step to the measurement sequence even without NC programming knowledge
- Automatic access to the data defined in the tool table
- Definition of global jobs for each tool type



Selection of a job in ToolControl



Definition of a job

2. Stability function

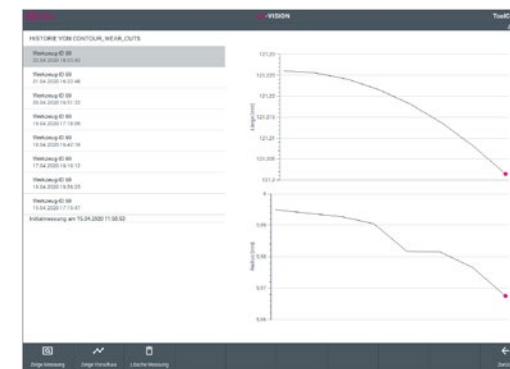
- Definition of stability criteria
- Measurement of spindle elongation over a defined time and speed
- Enables processing under thermally stable spindle conditions
- Automatic update of the length value in the tool table after reaching the thermally stable state
- For the highest accuracy and process stability



Stability test

3. Visualisation & data transfer

- Visualisation of the measurement processes of tool length and radius including the tool-specific wear limits
- Wear evaluation: Comparison between initial measurement and current measurement
- Graphical display of the measured values of the longest cutting edge
- Data export of measured values for processing in tool management systems



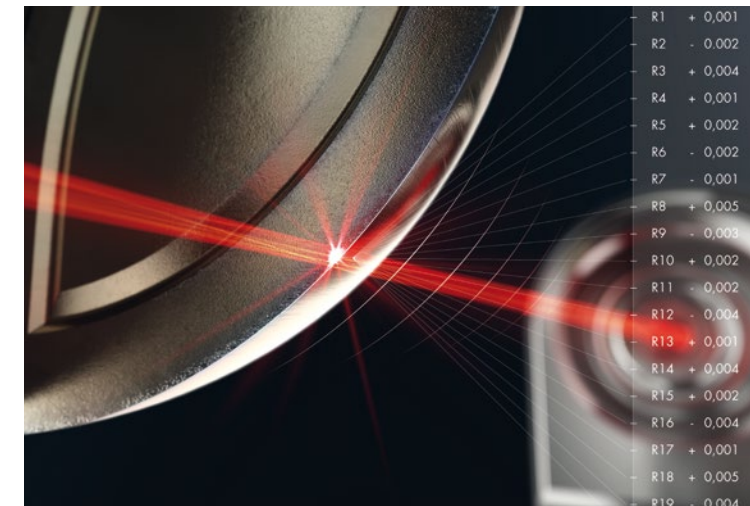
Wear history of a tool



04 OPTIONAL TECHNOLOGY CYCLES FOR LC-VISION

HIGH-TECH FUNCTIONS OF THE NEXT GENERATION

Only in combination with LC-VISION is it possible to optimally use the new features of the DIGILOG laser measurement systems from BLUM. It has never been easier to generate measurement sequences or objectively assess the condition of the tool and spindle. The range of functions is constantly being expanded. In addition to the standard functions, the "ToolControl Advanced", "SpindleControl" and "OscillationControl" technology cycles are currently available.



TOOLCONTROL ADVANCED

ToolControl Advanced gives you a comprehensive picture of the current condition of your new and used tools and thus increases the precision and productivity of your manufacturing processes.

- Simple creation of measurement sequences (jobs) even for an extended range of tools
- DIGILOG measurement of complex tool geometries
- Evaluation of the entire tool geometry for automatic correction of the tool table
- Visualisation of measurement process and tool-specific wear limits on the control screen
- Evaluation and compensation of shape deviations
- Statistical evaluation of tool wear
- Covers functions of image-processing systems
- Stability function

Tool type

ToolControl Advanced can be used for the measurement and visualisation of different tool types.



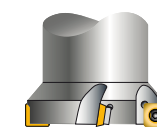
End mill



Torus mill



Ballnose mill



Facing mill

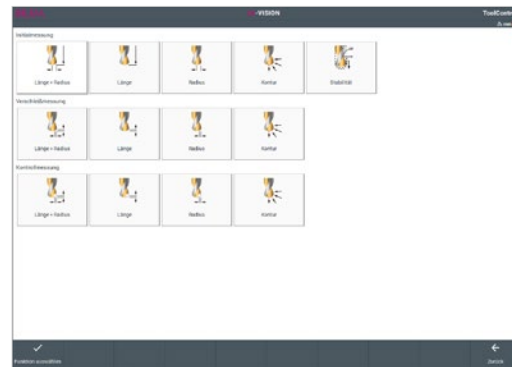


Circle segment end mill

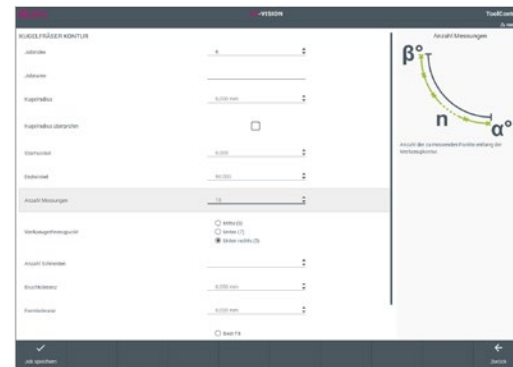
FUNCTIONALITY

1. Job creation

- Intuitive generation of jobs for many tool types and measuring tasks
- A user interface for all common machine controls
- Step by step to the measurement sequence even without NC programming knowledge
- Automatic access to the data defined in the tool table
- Definition of global jobs for each tool type



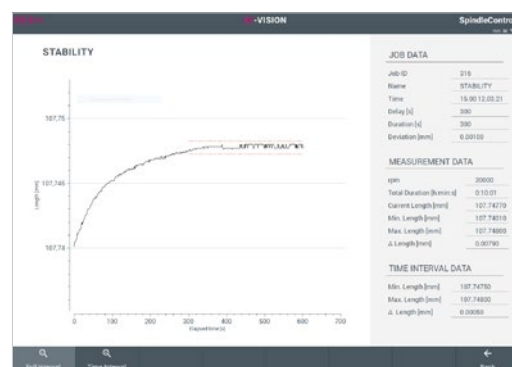
Selection of a job in ToolControl



Definition of a job

2. Stability Function

- Definition of stability criteria
- Measurement of spindle elongation over a defined time and speed
- Enables processing under thermally stable spindle conditions
- Automatic update of the length value in the tool table after reaching the thermally stable state
- For the highest accuracy and process stability
- Possible with all tool types

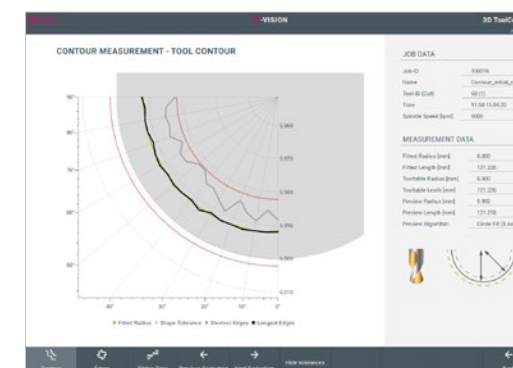


Stability test

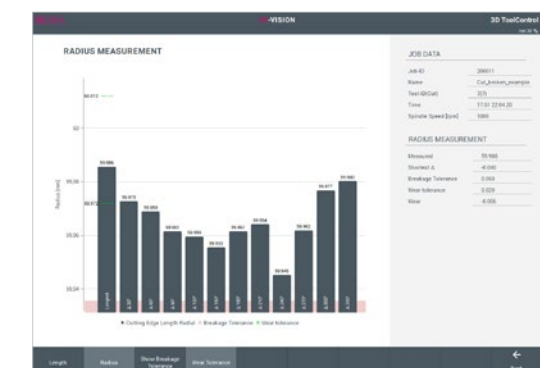


3. Visualisation & data transfer

- Visualisation of measured values such as length, radius, corner radius and the entire tool contour
- Representation of the tool-specific wear limits
- Wear evaluation: Comparison between initial measurement and current measurement at different contact angles
- Graphical display of the measured values of individual cutting edges
- Run-out evaluation for the tool and individual cutting edges
- Form evaluation: Comparison of the current measurement with the target contour
- Data export of measured values for processing in tool management systems



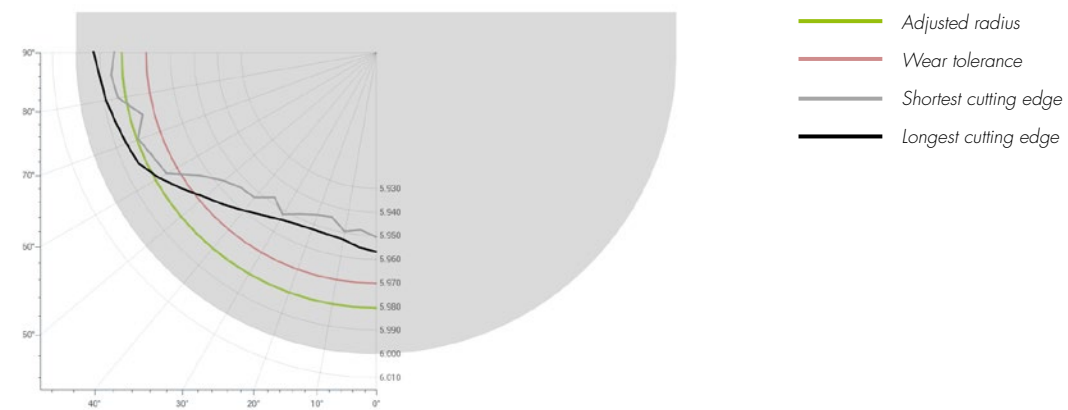
Visualisation of the measuring results of a ballnose mill



Single cutting edge evaluation of a tool

4. Compensation

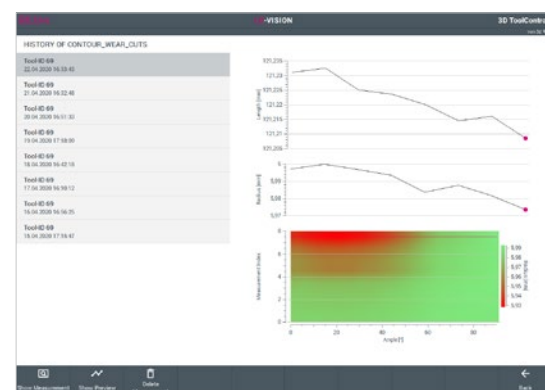
- Comparison between initial measurement and current measurement at several contact angles
- Update and compensation of wear values
- Possibility to classify and, if necessary, lock tools
- Different evaluation methods for defining a user-specific compensation strategy:
Best-fit (correction L), Circle fit 3 Axes (correction R), Circle fit 5 Axes (correction L + R)
- Increase in tool usage duration, surface quality and workpiece quality



Comparison between initial measurement and current measurement

5. Statistics

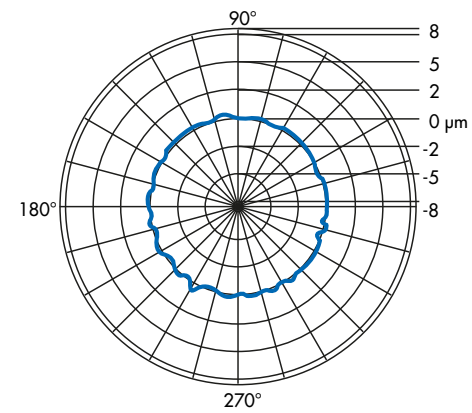
- Recording and statistical evaluation of all measurements
- Enables service life analyses and comparisons of tools
- Graphic display of individual measurements



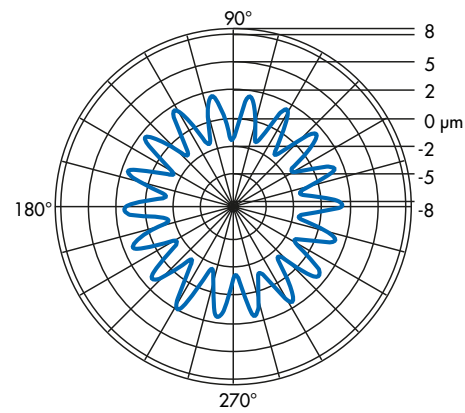


SpindleControl gives you a comprehensive view of the current state of your machine spindle. The extensive functions of the technology cycle are available to you for the machine-integrated version as well as the mobile version.

- Spindle analysis for preventive maintenance
- Vibration analysis
- Testing at various speeds
- Freely definable warning and tolerance limits
- Logging and statistical analysis



Run-out characteristic of a good spindle



Run-out characteristic of a spindle with bearing damage

FUNCTIONALITY

PSC gives you a comprehensive picture of the current condition of the machine spindle. The following functions are available for assessing the spindle quality:

1. Run-out analysis

- Speed-dependent visualisation of the radial and axial run-out behaviour

2. Stability analysis

- Inspection of the thermal change behaviour of the spindle

3. Vibration analysis*

- Vibration measurement and analysis at different speeds
- Evaluation of the spindle bearing condition through FFT analysis

4. Spindle parameter analysis*

- Evaluation of the typical spindle parameters (LTSH, STSH, run-out, peak to peak) based on ISO/TR 17243

* Assessment of the probability of failure and the degree of spindle wear possible [expert knowledge required]



Example of a run-out analysis

Example of a spindle analysis

Example of a vibration analysis

Example of a stability analysis

SOFTWARE STRUCTURE

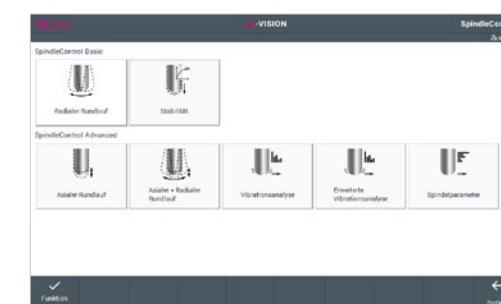
SpindleControl Basic

Simple and straightforward operation to start the spindle analysis.



SpindleControl Advanced

Full scope of functions for the machine manufacturer, who makes a self-defined job package available to the user.



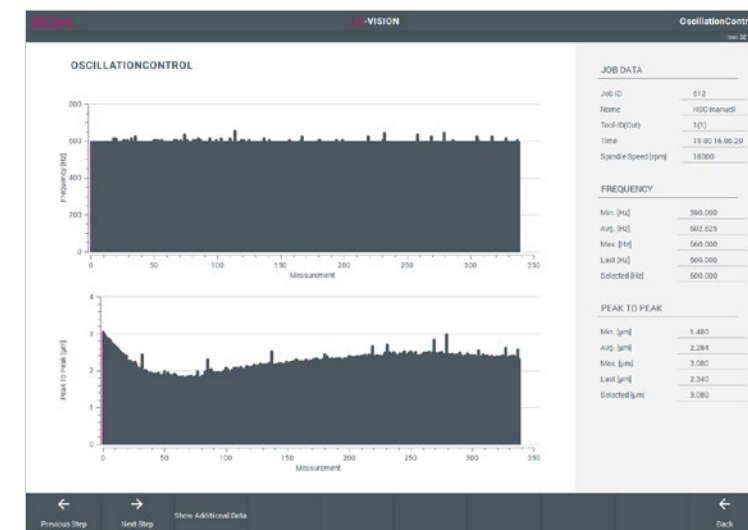


OSCILLATIONCONTROL

The OscillationControl technology cycle is used in processing centres with ultrasound technology for vibration analysis of oscillating tools. Based on the measured values, the vibration settings of the machine can be checked and, if necessary, optimised, which reduces tool wear and improves the surface quality of the workpiece.

FUNCTIONALITY

- Measurement of vibration frequency and amplitude of a tool in the tool length axis
- Calculation of the deviation of amplitude and/or frequency from the target value
- Visualisation of the measured values on the machine control
- Use of the recorded data for automatic adaptation of the vibration settings of the ultrasound unit (depending on the machine and manufacturer)

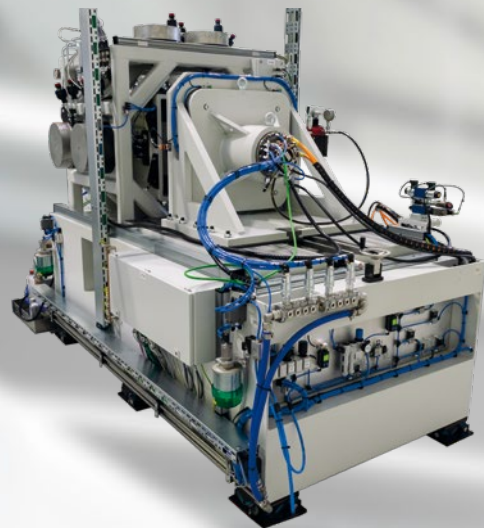


Example of vibration analysis

OUR PRODUCT RANGE OF MOTOR SPINDLE IN MACHINE TOOLS

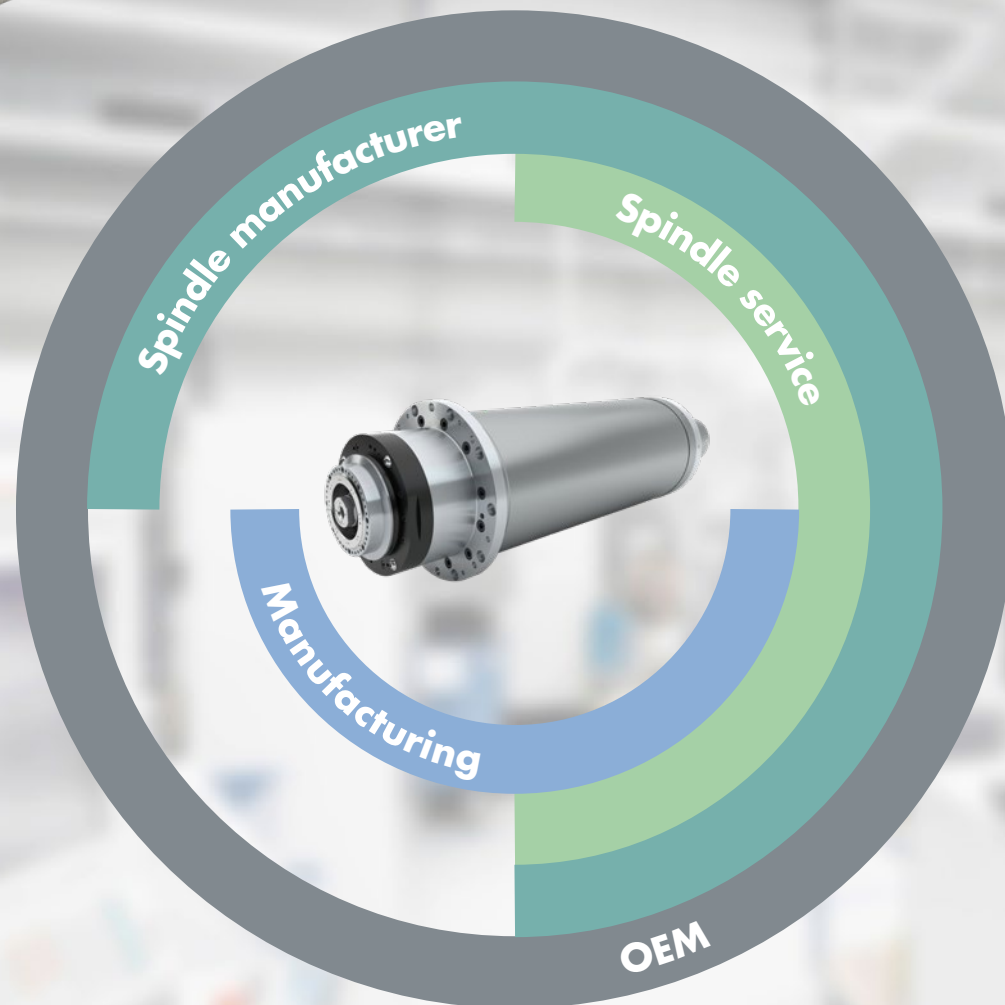
EXPERTISE FROM THREE BUSINESS UNITS

Apart from the SpindleControl technology cycle, which is a machine-integrated variant, Blum-Novotest also offers solutions that document the state of the motor spindles over the life cycle: The portfolio ranges from a laboratory test stands for spindle development and an end-of-line test stand for spindle production to a mobile solution in the form of our Portable SpindleControl.



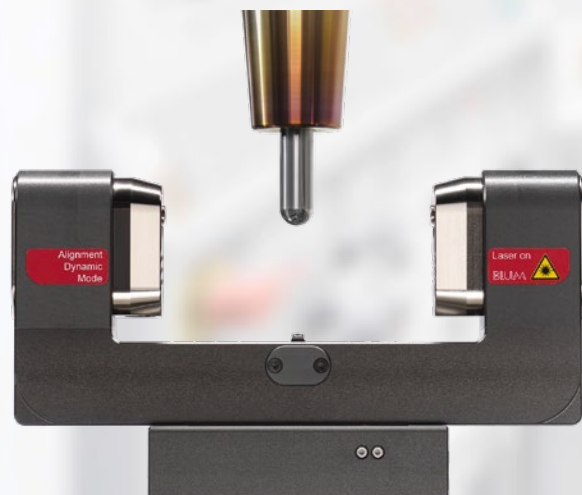
SL100 - Spindle development

- Spindle manufacturer
- OEM



SE100 - Spindle assembly

- Spindle manufacturer
- OEM
- Spindle service



SpindleControl - Manufacturing process

- Manufacturing
- OEM



PSC - Service, maintenance, repair

- Spindle manufacturer
- OEM
- Manufacturing
- Spindle service
- Maintenance/Repair Department

www.blum-novotest.com